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# Exploring Students Behavior on Seating Arrangements in Learning Environment: A Review

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**Abstract**

This paper reviews the current methods of investigating student's behavior in relation to classroom seating arrangement. Seating arrangements have been found as influencing students' behavior within a classroom. Most of the previous works used observation and questionnaire methods to measure the impact of seating arrangement on student's behavior, but the results often show missing link to the culture to which the student belonged. As culture may cause different tendencies in classroom behavior, expansion of the current methodology is vital. This paper highlights the potential application of Means- End Chain model in measuring students' learning behavior in the context of seating arrangement.

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*Keywords:* Seating arrangement; learning environment; class setting; Means End Chain

## 1. Introduction

Although seating arrangement of classroom may not sound a novel concept, several educators believe that it is critical for learning performance. Most of the information in literature addresses issues such as room temperature, room lighting, and acoustics (Conners, 1983, Granstrom, 1996), but fewer studies have

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been done on classroom seating arrangement and its effects on students' actions and learning. It should be stressed that knowledge on classroom seating arrangement is critical for several factors concerning students and education, particularly for practical implementation of the findings. In practical terms, a classroom must be so designed to enhance performance of the students.

It can be argued that learning environments are virtually inappropriate without proper and effective seating arrangement. Configurations of seating arrangement can positively or negatively affect student performance. For example, Laboratory classes are designed for free moving chairs and double tables, while conference classrooms need to be arranged in circle or square configuration. It is clear that seating arrangement effects on the extent and nature of student interaction. Therefore, creating an environment, through physical layout of the seating will support achievement of learning objectives. Several literatures suggest that there are three different classroom seating arrangements— row, cluster, and horseshoe— that are influential to learning behavior of students within a classroom. Besides promoting various targeted behaviors, seating arrangement may also enhance the instructors' ability to perform teaching in order to achieve their learning objectives.

Understanding how seating arrangement affects students and class conduct makes it possible to recognize a learning situation that is extra beneficial and more conductive to learning for the students. Adding to that, it is also essential to explore the influence of cultural aspects of the students on seating arrangement; this will allow more relevant understanding on student's behavioral tendencies in different geographical and cultural context. Therefore exploring the use of Means-End Chain (MEC) as an expansion from the existing research methods is relevant.

## 2. Literature review

Although much attention has been given to effective learning, little attention is given to the physical spaces where learning actually occurs. Several studies reveal that students' classroom behavior is influenced by various factors, including environment and their understanding of the definition of appropriate behavior. Downer et al. (2007) and others (Canter & Canter, 1976; Curwin & Mendler, 1988; Badia-Martin, 2006) point out that school classroom has an important effect on the students. Physical features of a setting can affect and adjust oneself within a given space such as form or room dimensions, furniture composition, and spaces provision in the room (Gifford, 2002). Therefore, physical setting of the classroom is extremely important for students (Atherton, 2005). Educators often design the classroom setting with one methodology in mind and simply never change the classroom setting to be more conducive to particular assignments (Anderson, 2007). Richards (2006) discovered that location of a pupil within a classroom seating arrangement may also affect his or her performance. A poor seating arrangement can affect students' learning by 50% when they stand or sit 20 feet (6 meters) or more away from visual aids within the classroom (Black, 2007). Modifying seating arrangements may be a method to reduce disruptive behavior that influence on the class environment.

The traditional classroom setting is generally limited to three seating arrangements (rows, horseshoe, and clusters of four) due to space limitations (Weinstein, 1979). In fact much of studies on seating arrangement centers around the three mentioned arrangements with some other variations including semicircle, concentric circles and fishbowl (Bonus and Riordan, 1998; Atherton, 2005; Ankney, 1974). In support to the significance of the three seating arrangements, other researchers (Michelle Bonus and Linda Riordan, 1998) conclude that students' attentiveness increases when the classroom seating arrangement supports the instructional goal.

Steinzor (1950) and Gump (1987) hypothesize; students seated around tables distributed through a classroom can establish face-to-face contact more easily than those seated in rows-and-columns. The U-shaped arrangement supports social interaction among pupils and makes an enhanced sense of

community. It is because; instead of merely facing the teacher, students' confront one another (Hurt et al. 1978). Students around tables are not always oriented toward a teacher and toward the eye-contact control that the teacher employs. Steinzor's (1950) work also suggest that pupils will ask more questions in assigned semicircular seating arrangements than in assigned row and column seating arrangements even in ordinary-sized classes. In U-shaped organization, the class involvement among pupils sitting straight across from the lecturer was the greatest (Sommer, 1969).

According to Atherton (2005) row arrangements within the classroom setting support a top-down (teacher-student) approach to learning. The students in this setting are meant to be seen and not heard or, stated differently, students are passive learners. Atherton (2005) goes on to point out that active learners within the classroom setting are better created through circle or cluster seating arrangements. Seating organizations assist interactions by position and contiguity. Heindselman et al. (2007) discovered from their research that there exist influences of seating organization changes on grades within an examination condition and on perception of capability. This was discovered parallel with Rennells and Chaudhari (1988) findings that pupils in the action-zone of the class, especially on tests, regularly performed superior. As a conclusion, classroom arrangement affects pupil behavior, and influencing their attainment as well (Pace and Price, 2005). Furthermore, as they grow older, behavioral patterns of children tend to modify (Slavin, 2003); therefore pupil behavioral reactions may also change with age based on seating organizations.

Despite several studies have been carried out on the effects of seating arrangements on student behavior, studies on the effects of student perception on seating arrangement in certain cultural context are still lacking. To further elaborate on this issue, two important questions need to be raised: 1) If a student is given a freedom to choose seating arrangement preferred by him/her, which seating arrangement would he/she select? 2) If a student is given a freedom to choose their own seating location in any of the three layouts, which particular seat would be his/her selection? The authors assume that understanding students' perception on seating arrangement is important in order to understand suitability of the seating especially to schools in different cultural context. This can also be assumed as useful in supporting effective learning environment in a specific culture. These questions entail three research areas to be explored; 1) students' seating preferences in relation to student's personal motivation to the attributes of the seating arrangement; 2) Other classroom attributes that are related to student seating preferences; 3) appropriate research methods that are able to link between students' cultural background and seating arrangement/other classroom attributes.

## 3. Methodology and finding

### *3.1. Previous research methodology for exploring students' behavior on seat arrangement*

Previous research on student behavior and seating arrangement focused mainly on observation and questionnaire (Table 1). To fully understand the methods, three of the methods shown in Table 1 are discussed in detail. Marx et al. (1999) conducted their research by using an observational method. Over the 8 weeks of the study, observations were made in 27 lessons in the row and column organization and 26 lessons in the semicircle seating arrangement. Observations were made in both mathematics lesson and German lesson, each lesson lasting 45 minutes. (Marx et al. 1999) collected data from 53 lessons spread across 8 weeks. German students (M = 10 years, SD = 0.63; 15 girls; white) enrolled in a fourth-grade class. The class was taught by an experienced and competent female teacher. Students were placed in a row and column and next in a semicircle seating organization for 2 weeks each. Students were casually assigned to seats with each of the four changes in seating organization. Marx et al. (1999) examined the

impact of different classroom seating organizations on the characteristics of the questions asked and the frequency of question asking by a sample of primary school children.

Table 1. Other research method

| Authors names | Research methodology employed |
|---|---|
| Anderson (2009) | Observation |
| Heindselman et al. (2007) | Observation and questionnaire |
| Marx et al. (1999) | Observation |
| Koneya (1976) | Questionnaire |
| Kaya and Burgess (2007) | Observation and questionnaire |
| Campbell (2009) | Observation |
| Wannarka and Ruhl (2008) | Review research |

Another researcher, Anderson (2009) applied quantitative, quasi-experimental, or a repeated-condition design (Ankney, 1974). Trained observers were employed to watch films of a participating classroom. The films were made daily at the same time and were collected daily. While observing the film, observers used a tally sheet, marked each time a student demonstrated a target behavior. Anderson (2009) gathered data from the private school being studied; 20 students were chosen, using a convenience sampling process from a class size of 20. The population being studied was 20 students in a traditional fifth grade class in a private school. All students within the classroom were included in the research. The research was conducted within a language arts classroom setting with the students performing multiple assignments within this setting. Gall et al. (2003) indicate that in experimental research a minimum number of 15 participants are needed to allow the results of the research to be representative of all fifth grade classrooms within the school itself. Therefore, the total number of the population of interest is 20 students, resulting in the entire class being included in the study.

In Heindselman et al. (2007) study, participants were assigned to certain seat locations and observed three educational films each for ten minute, thereafter summarized on paper. Later, participants answered a short Likert questionnaire to investigate their capability, comfort, and knowledge based on the movies shown to them. (Heindselman et al. 2007) The participants involved were 22 pupils from Hanover College who registered for the experiment in the Psychology Department of the college. The nine-item questionnaire was created to calculate participants' evaluations of their note-taking capabilities, which used a Likert scale, and how well pupils would perform on an examination if it were managed. Participants were later given a 10-item quiz.

### *3.2. Finding of previous studies*

Marx et al. (1999) examined the connection between the question asking and classroom seating arrangements. They discovered that pupils' social interaction progressed in semi-circle configuration, and students asked more questions in comparison to row and column organization. In this seating arrangement, pupils ask questions and learn more. They also found that, there was an action zone in the row and column organization in which pupils asked more questions for each lesson. They argued that semi-circle situation itself might have an affirmative configuration for sharing instructional understandings. They discovered that by asking questions pupils are absorbed, helped and understood more. Marx et al. (1999) have developed a concept of action zones in their study and discovered that

pupils who sat within the concept zones had achieved higher rates of course success and had more probability to participate. Pupils' who sat within the aforementioned zones tend to ask more questions and participate better in the classroom (Fuhrer, 1994; Van der Meij, 1986).

Anderson (2009) found that pupils were on-task 97% of the time in the cluster seating organization, 91% of time in the row seating organization and 96% of the time in the horseshoe seating arrangement and there is nearly no significant connection between teacher-student proximity and seating arrangement. Both the cluster and row seating arrangements resulted in the teacher being within proximity to the student 3% of the time. The horseshoe seating organization resulted in the teacher being in proximity to the student 2% of the time. Also, the results show a relationship between the teacher and the students communication and seating organizations. The row seating arrangement resulted 10% of the time in verbal interaction between the teacher and student. The horseshoe seating organization resulted 6% of the time in verbal interaction between the teacher and student. Finally, the cluster seating organization resulted 5% of the time in verbal interaction between the teacher and student. These results indicate that seating arrangements can have an influence on students' on-task behavior within the class.

According to Heindselman et al. (2007) there was no significant impact of seating organization on participants' capability, their information, or participants' ability perception. Kaya and Burgess (2007) found that pupils who choose seats at the end of rows of tables in separate seats and tablet-arm chair had better marks than students who chosen middle seats in a row. In addition, pupils who would rather seat at the end of rows of tables with single chair organization had more demand to describe their territory than pupils who chose middle places in a row.

### *3.3. Potential use of Means-End Chain (MEC) in investigating of students' behavior in classroom*

What has not been explained in the works discussed above are 1) whether the students were assigned to the seating based on their own will or by direction from their teachers. One can imagine, if a student does not like the seat given to him/her, his/her reaction to the learning activities would be different to a student who likes the given seat, 2) the cultural context to which the students belong. A study by Ahmad and Majid (2010) indicates that culture has a strong influence on students' performance in classroom, and they suggest that cultural factors must be taken into account in classroom arrangement (design). Therefore, in order to understand seating arrangements and student behavior comprehensively, one has to understand the tendency of their seating preferences which is directly related to their culture. In this way Person Environment Congruence – a favorable environment setting - (Jusan 2010) in the design of a learning environment (such as a classroom seating) may be achieved.

In order to investigate the relationship between seating arrangement and students' cultural background, appropriate methods must be identified as an expansion to the current methods. The authors suggest Means End Chain (MEC) research model as appropriate to be used in linking students' cultural aspects to seating arrangement. MEC model has been widely used to understand consumer's behavior on products selection. and even for housing can support learning environment in school.

According to MEC theory, person's evaluation in choosing products is determined by his values Gutman (1982). The use of research model has been expanded into housing preference studies by Coolen and Hoekstra (2001). Later Jusan (2007) applied the model into a study on housing personalization, in order to identify why house owners in Malaysian mass housing renovate their houses. He discovered that house modification undertaken by the users were reflections of what were expected by their values. Another work of MEC (Zinas and Jusan, 2010) has shown that user values can be linked to user preferences on selection of house finishes.

The appropriateness of MEC to be used in investigation students' behavior in learning environment is stemming from the fact that "user-value" is considered as an expression of culture. In fact, values

originate from culture (Rapoport 2000; Rokeach, 1973). Rokeach (1973) suggest that values are developed from one's lifetime experience. According to Assael (1998), values are learned, whether by formal or informal learning, or by technical learning.

It is therefore appropriate to suggest value to be used as an important cultural variable for investigating students' behaviour in classroom. With MEC, the influence of culture (which is expressed by user-values) on seating arrangement can be made more systematically by the associative network of MEC which appears as follows:

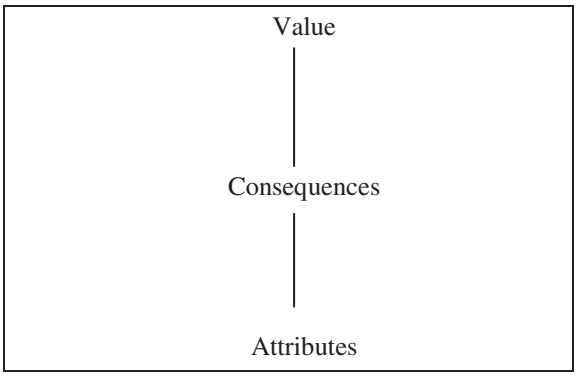


Fig. 1. The original Means-End Chain model. Source: Olson and Reynold, 2011

Gutman's MEC model (which can be explained in terms of learning environment) assumes that attributes of the environment lead to various consequence of experience that in turn satisfy user value. Attributes of a learning environment can be considered as relevant, or required by certain user-values when the attributes are able to produce positive consequences and they are linked to the values. This can be identified through in-depth interviews called "laddering interview". By using a standard method, selection of attributes can be systematically linked to user-values. In this way the influence of cultural factors on students' preferences on seating arrangement can be established.

## 4. Conclusion

In conclusion, the traditional seating arrangements are meaningful to classroom setting, and a key component to students behavior hence class performance. However, the current studies focus mainly on the direct relationship between the arrangement and students' behavior. As to improve effectiveness of classroom design, particularly with regard to seating arrangement, further study on the influence of students' cultural background should be carried out.

Exploring of students' behavior on seat arrangement based on MEC theory has several benefits for classroom environment according to students' expectation. By applying this theory to research on learning, researchers will be able to establish crucial key factors for students to improve their expectation and enhance the goal of learning. In each seat arrangement type such as row-and-column, cluster or semicircle, researchers can recommend appropriate preferences based on students' expectations which leads to the achievement of person-environment congruence (PEC). For the first step, it is necessary to focus on classroom attributes and students motivation in the classroom. This is a novel field that MEC theory is able to contribute to the growth of sustainable classroom for students. In this way, seating

arrangement can be properly linked to the cultural context of the school, thus more suitable classroom design can be suggested for better classroom performance.

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